TABLE OF CONTENTS

INTRODUCTION

SECTION II includes the mandatory operating limitations, instrument markings, and basic placards necessary for the safe operation of the airplane, its engine, standard systems and standard equipment.

The limitations included in this section have been approved by the Federal Aviation Administration.

When applicable limitations associated with optional systems or equipment such as autopilots are included in SECTION IX.

| NOTE |

The airspeeds listed in the Airspeed Limitations chart (Figure 2-1) and the Airspeed Indicator Markings chart Figure 2-2) are based on Airspeed Calibration data shown in SECTION V with the normal static source. If the alternate static source is being used, ample margins should be observed to allow for the airspeed calibration variations between the normal and alternate static sources as shown in SECTION V.

Your Mooney is certificated under FAA Type Certificate No. 2A3 as a Mooney M20M.

NOISE LIMITS

The certificated noise level for the Mooney M20M at 3368 lbs. (1528 Kg.) maximum weight is 74.03 dB(A) (FAR 36) & 71.0 dB(A) (ICAO 16). No determination has been made by the Federal Aviation Administration that the noise levels of this air plane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Figure 2-1. This calibration assumes zero instrument error.

V / SPEED		KCAS/KIAS	REMARKS
V_{NE}	Never Exceed Speed	195/195	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	174/174	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed at:		
	lbs. /Kg.		
	2600/1179	111/111	Do not make full or abrupt control movement above this speed.
	2900/1315	117/117	
	3200/1452	123/123	
	3368/1528	126/127	
V_{FE}	Maximum Flap Extended Speed	109/110	Do not exceed this speed with flaps in full down position.
V_{LE}	Maximum Landing Gear Extended Speed	165/165	Maximum speed at which the aircraft can be safely flown with the landing gear extended.
V_{LO} (EXT)	Max. Speed for Gear Extension	139/140	Max. speed at which the landing gear can be safely extended.
V_{LO} (RET)	Max. Speed for Gear Retraction	104/106	Maximum speed at which the landing gear can be safely retracted.
	Maximum Pilot Window Open Speed	133/132 * *Some A/C may show lower speeds	Do not exceed this speed with pilot window open.

FIGURE 2-1 AIRSPEED LIMITATIONS

AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings, their color code and operational significance are shown in Figure 2-2.

MARKING	IAS VALUE or RANGE (KIAS)	SIGNIFICANCE
White Arc (Flap Operating Range)	59 - 110 KIAS	Lower limit is maximum weight V_{so} in landing configuration. Upper limit is maximum speed permissable with flaps extended.
Green Arc (Normal Operating Range)	66 - 174 KIAS	Lower limit is maximum weight V_s with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow Arc (Caution Range)	174 - 195 KIAS	Operations must be conducted with caution and only in smooth air.
Radial Red Line	195 KIAS	Maximum speed for all operations.

FIGURE 2-2 AIRSPEED INDICATOR MARKINGS

POWER PLANT LIMITATIONS

Number of Engines	1
Engine Manufacturer	TEXTRON-Lycoming
Engine Model Number	TIO-540-AF1A *

Engine Operating Limits for Takeoff and Continuous Operations:

Maximum Continuous Power	270 BHP
Maximum Continuous RPM	2575 RPM
Transient RPM Limit	2700 RPM
Maximum Manifold Pressure	38 in. Hg.
Maximum Turbine Inlet Temperature (TIT) Continuous	1750° F
Maximum Cylinder Head Temperature	500° F(260° C)
Maximum Oil Temperature	245° F(118° C)
Minimum Oil Temperature-Grnd. Run-up	75° F(24° C)
Minimum Oil Timperature-Takeoff	100° F(38° C)

Oil Pressure

Normal Operating	55-95 PSI
Minimum (IDLE ONLY)	25 PSI
Maximum (cold oil)	115 PSI

Oil Specification	MIL-L-22851 and TEXTRON-Lycoming Approved oils
Fuel Grade (Color)	100LL (Blue)** or 100 octane (Green) **
Number of Propellers	1
Propeller Manufacturer	McCauley
Propeller/Blade Model Number	B3D32C417/82NRD-7
Number of Blades	3

Propeller Diameter:

Min	75 In. (190.5 cm)
Max.(No cutoff allowed)	75 In. (190.5 cm)

Propeller Blade Angles @ 30.0 In. sta.:

Low	15.1 Degrees +/- 0.2 Degrees
High	43.0 Degrees +/- 0.5 Degrees

Propeller Operating Limits	2575 RPM

*TIO-540-AF1B ENGINE INSTALLED S/N 27-0211 & ON. OPTIONAL FOR S/N 27-0108 THRU 27-0210.

** 100LL fuel is calibrated at 5.82 lb/gal(.69 Kg/liter)
100 octane fuel is calibrated at 6.0 lb.gal. (.72 Kg/liter)

POWER PLANT INSTRUMENT MARKINGS

INSTRUMENT	REDLINE MINIMUM LIMIT	GREEN ARC NORMAL OPERATING	YELLOW ARC	REDLINE MAXIMUM LIMIT
Tachometer	500 RPM No Redline	2200-2575 RPM		2575 RPM
Manifold Pressure		10.0 - 38.0 In Hg.*		38.0 In Hg
Turbine Inlet Temperature		1300 - 1750° F (704 - 954°C)		1750° F (954°C)
Cylinder Head Temperature		250-500° F (121 - 260°C)		500° F (260°C)
Oil Temperature	No Redline	100 -245° F (37 - 118°C)		245° F (118°C)
Oil Pressure	25.0 PSI (IDLE ONLY)	55-95 PSI	25 - 55 PSI 95 - 115 PSI	115 PSI
Fuel Pressure **	15 PSI	24 - 55 PSI	15 - 24 PSI	55 PSI

* Normal operating range, no green arc required.

** 27-0108 THRU 27-0257

NOTE
Refer to TEXTRON-Lycoming Engine Maintenance and Operators Manual Section on Engine Specifications and Operating Limits for recommended cruise power and temperature limitations.

FIGURE 2 - 3 POWER PLANT INSTRUMENT MARKINGS

FUEL LIMITATIONS

////////////////////
// WARNING//
////////////////////

Takeoff maneuvers when the selected fuel tank contains less than 12 gallons (45.4 liters) of fuel have not been demonstrated.

| NOTE |

Each fuel quantity gauge is calibrated to read zero (RED LINE) only in coordinated level flight when the quantity of fuel can no longer be safely used.

| NOTE |

An optional visual fuel quantity gauge is installed on top of each tank and is to be used as a reference for refueling tanks only.

Standard Tanks (2)	47.5 U.S. Gal. each (179.8 liters)
Total Fuel	95 U.S. Gal.(359.6 liters)
Usable Fuel:	89 U.S. Gal. (336.8 liters)
Unusable Fuel:	6 U.S. Gal. (22.7 liters)

Fuel Grade (and color): 100LL (low lead) (blue) or 100 octane (green) is approved.

~ CAUTION ~

To reduce the possibility of ice formation within the aircraft or engine fuel system it is permissible to add ISO-PROPYL alcohol to the fuel supply in quantities NOT TO EXCEED 1% of the total fuel volume per tank. DO NOT add other additives to the fuel system due to potential deteriorating effects within the fuel system.

WEIGHT LIMITS

Maximum Weight - Takeoff	3368 lb. (1528 Kg.)
Maximum Weight - Landing	3200 lb. (1452 Kg)
Maximum Weight in Baggage Compartment	120 lb. (54.4 Kg.) @ Fus. Sta. 101.5 (253.7 cm)
Maximum Weight in Rear Storage Area	10 lb. (4.54 Kg.) @ Fus. Sta. 131.0 (297.5 cm)
Maximum Weight in Cargo Area (Rear seats folded down)	340 lbs. (154.2 KG) @ Fus. Sta. 70.7 (176.8 cm)

CENTER OF GRAVITY LIMITS (GEAR DOWN)

Most Forward	Fus. Sta. 41.0 IN. (104.1 cm) @ 2430 LB. (1102 Kg) 16.79% MAC
Intermediate Forward	Fus. Sta. 44 IN.(111.7 cm) @ 3300 lb. (1497 Kg) 21.7% MAC
Forward Gross	Fus. Sta. 46.0 IN. (116.8 cm) @ 3368 lb (1528 Kg) 24.98% MAC
Aft Gross	Fus. Sta. 51.0 IN(129.5 cm) @ 3368 lb. (1528 Kg) 33.18% MAC
MAC (at Wing Sta. 94.85) (241 cm)	61.00 In.

Datum(station zero) is 13 inches (32.5 cm) aft of the center line of the nose gear trunion attach/pivot bolts.

MANEUVER LIMITS

This airplane must be operated as a Normal Category airplane. Aerobatic maneuvers, including spins, are prohibited.

| NOTE |

Up to 500 foot altitude loss may occur during stalls at maximum weight.

FLIGHT LOAD FACTOR LIMITS

Maximum Positive Load Factor	
Flaps Up	+3.8 g.
Flaps Down (33 Degrees)	+2.0 g.
Maximum Negative Load Factor	
Flaps Up	-1.5 g.
Flaps Down	.0.0 g.

FLIGHT CREW

Pilot	One
Maximum passenger seating configuration	Three

OPERATING LIMITATIONS

Maximum operating altitude is 25,000 feet MSL.

Takeoffs with the cowl flaps inoperative are prohibited.

Enginerestarts should not be conducted above 23,000 ft. altitude.

When operating above 22,000 feet and at manifold pressures above 32 IN. Hg., only best power mixture (1650° F (898°C) TIT) or richer is permitted

OXYGEN SYSTEM LIMITATIONS

| NOTE |

Only masks which have end fittings marked with a green band are acceptable for use with this system.

KINDS OF OPERATION LIMITS

This is a Normal Category airplane certified for VFR/IFR day or night operations when the required equipment is installed and operational as specified in the KINDS OF OPERATION EQUIPMENT LIST and the applicable operating rules.

Optional equipment installations may not be required to be operational.

The pilot must determine that the applicable operating rules requirements for each kind of operation are met.

OPERATIONS IN KNOWN ICING CONDITIONS ARE PROHIBITED.

Autopilot Limitations- See SECTION IX.

KINDS OF OPERATION EQUIPMENT LIST

The following equipment was approved during Type Certification and must be installed and operable for each kind of operation as specified.

| NOTE |

The KINDS OF OPERATION EQUIPMENT list may not include all the equipment as required by applicable operating rules.

SEE NEXT PAGE FOR LISTINGS.

KINDS OF OPERATION EQUIPMENT LIST

SYSTEM or COMPONENT	VFR DAY *	VFR NIGHT	IFR DAY	IFR NIGHT
AIRSPEED INDICATOR	1	1	1	1
ALTIMETER, SENSITIVE	1	1	1	1
MAGNETIC DIRECTION INDICATOR	1	1	1	1
MANIFOLD PRESSURE GAUGE	1	1	1	1
TACHOMETER	1	1	1	1
FUEL QUANTITY INDICATOR	2	2	2	2
FUEL PRESSURE INDICATOR	1	1	1	1
OIL PRESSURE INDICATOR	1	1	1	1
OIL TEMPERATURE INDICATOR	1	1	1	1
CYLINDER HEAD TEMPERATURE INDICATOR	1	1	1	1
TURBINE INLET TEMPERATURE INDICATOR	1	1	1	1
ALTERNATOR LOAD METER	1	1	1	1
ALTERNATOR	1	1	1	1
LANDING GEAR POSITION INDICATOR	2	2	2	2
SEAT BELT & SHOULDER HARNESS FOR EACH OCCUPANT **	1	1	1	1
OXYGEN MASK FOR EACH OCCUPANT ***	1	1	1	1
POSITION LIGHTS		3		3
STROBE LIGHTS (ANTI-COLLISION)		3		3

* Equipment must be installed and operable for all operations.
** If inoperative for unoccupied seat(s), seat(s) must be placarded: "DO NOT OCCUPY"
*** Only required when the operating rules require use of oxygen.

KINDS OF OPERATION EQUIPMENT LIST (con't.)

SYSTEM or COMPONENT (con't.)	VFR DAY *	VFR NIGHT	IFR DAY	IFR NIGHT
GYRO-HORIZON			1	1
DIRECTIONAL GYRO			1	1
TURN COORDINATOR or TURN & BANK INDICATOR			1	1
LANDING LIGHT ****		1		1
INSTRUMENT LIGHTS (INTERNAL or GLARESHIELD)		1		1
CLOCK (WITH SWEEP SECOND HAND or DIGITAL)			1	1
COMMUNICATION SYSTEM			1	1
NAVIGATION SYSTEM (APPROPRIATE TO FACILITIES BEING USED)			1	1
BATTERIES	2	2	2	2
VACUUM SYSTEM/INDICATOR			1	1
FUEL BOOST PUMP	1	1	1	1
PILOT'S OPERATING HANDBOOK & AIRPLANE FLIGHT MANUAL	1	1	1	1
PITOT, Heated ****			1	1
OAT GAUGE ****			1	1
VSI ****			1	1
ALTERNATE STATIC SOURCE ****			1	1
STAND-BY VACUUM SYSTEM ****			1	1

* Equipment must be installed and operable for all operations.
**** When required by the appropriate regulations.

DECALS AND PLACARDS

CABIN INTERIOR

The following placards are relevent to proper operation of the airplane and must be installed inside the cabin at the locations specified.

OPERATING LIMITATIONS

THE MARKINGS AND PLACARDS INSTALLED IN THIS AIRPLANE CONTAIN OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS AIRPLANE IN THE NORMAL CATEGORY. THIS AIRPLANE IS CERTIFIED FOR DAY AND NIGHT VFR/IFR OPERATION WHEN THE REQUIRED EQUIPMENT IS INSTALLED AND OPERATIONAL. FLIGHT INTO KNOWN ICING CONDITIONS IS PROHIBITED. NO AEROBATIC MANEUVERS, INCLUDING SPINS ARE APPROVED. OTHER OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS AIRPLANE IN THIS CATEGORY ARE CONTAINED IN THE AIRPLANE FLIGHT MANUAL.
MANEUVERING SPEED (3368 LBS), 127 KIAS; (2600 LBS), 111 KIAS.

ON LEFT SIDE PANEL BELOW PILOT'S SIDE WINDOW

EMERGENCY MANUAL GEAR EXTENSION

1. PULL LANDING GEAR ACTUATOR CIRCUIT BREAKER.
2. PUT GEAR SWITCH IN GEAR DOWN POSITION.
3. PUSH RELEASE TAB FORWARD AND LIFT UP RED HANDLE.
4. PULL T-HANDLE STRAIGHT UP (12 TO 20 INCHES).
5. ALLOW T-HANDLE TO RETURN TO ORIGINAL POSITION.
6. REPEAT UNTIL GEAR DOWN LIGHT COMES ON (12 TO 20 PULLS). IF TOTAL ELECTRICAL FAILURE-SEE MECHANICAL INDICATOR.

S/N 27-0053 THRU 27-TBA FOR GROSS WT OF 3368 LBS.

CAUTION

1. TURN OFF STROBE LITES WHEN TAXIING NEAR OTHER ACFT OR WHEN FLYING IN FOG OR IN CLOUDS. STD POSITION LITES MUST BE USED FOR ALL NIGHT OPERATIONS.
2. IN CASE OF FIRE, TURN OFF CABIN HEAT.
3. DO NOT SCREW VERNIER CONTROLS CLOSER THAN 1/8" FROM NUT FACE.

S/N 27-0001 THRU 27-0052 IF C/W SB M20-248. If not C/W SB M20-248,: MANEUVERING SPEED FOR GROSS WT OF (3200 LBS) IS 123 KIAS

-980

CHECK LIST

TAKEOFF

CONTROLS	RUN-UP	DOOR
FUEL	PROP	WINDOW
INSTRUMENTS	WING FLAPS	ALT AIR
TRIM	SEAT LATCH	PARK BRAKE
COWL FLAPS	BELT/HARNESS	MIXTURE

CONDUCT RUDDER/ELEV TRIM CHECK PRIOR TO FLIGHT, SEE PILOT'S OPERATING HANDBOOK.

ON CONSOLE COMPART - MENT COVER

LDG

BELT/HARNESS	GEAR	MIXTURE
FUEL	WING FLAPS	PROP
BOOST PUMP		PARK BRAKE

-924

BOTH BATTERIES MUST BE INSTALLED FOR FLIGHT.

ON BATTERY ACCESS PANELS L/H & R/H

UPPER L/H INSTR. PANEL

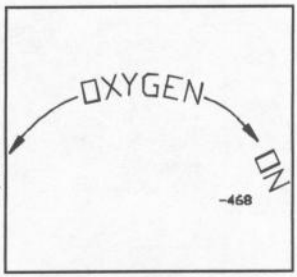
START STOP	CLEAR	MODE

FLAPS UP

FLAPS DOWN

CONSOLE ABOVE & BELOW SWITCH

PILOT'S L/H PANEL, FWD OF ARM REST



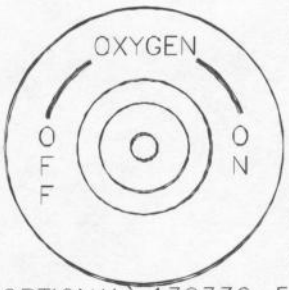
EFF.:27-0001 THRU 27-0180, 27-0182, 27-0183

WARNING

DO NOT EXCEED 170 LBS.
(77.1 Kg) ON THIS SEAT BACK.
SEE AIRCRAFT LOADING SCHEDULE DATA
FOR BAGGAGE COMPARTMENT ALLOWABLE.

-376

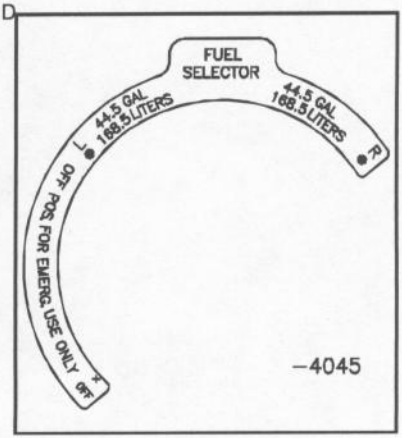
FWD END OF REAR SEAT BOTTOM STRUCTURE



(OPTIONAL) 130336-5

FLOOR BD BETWEEN SEATS------->

PILOT'S L/H PANEL FWD OF ARMREST <----------



EFF.: 27-0181, 27-0184 THRU 27-TBA

FUEL FLOW MEMORY	MIKE ISOLATION	DME NAV 1	NAV1 IND VOR	INTERCOM NORMAL	DME AUDIO	A/P SEL NAV 1
ON	ON				ON	
OFF	OFF	NAV 2	LORAN	PRIVATE	OFF	NAV 2

-919

TOP RT. RADIO PANEL (VARIES WITH INSTALLED EQUIP.)

PUSH
GR SAFETY
BY PASS

GEAR UP
106 KIAS

GEAR DOWN
140 KIAS
GEAR EXTD
165 KIAS

-921

UPPER
CTR
INSTR.
PANEL

ABOVE
INSIDE
BAGGAGE
DOOR
HANDLE

AUXILIARY EXIT
DO NOT OPEN IN FLIGHT
TO OPEN

1. PULL OFF COVER
2. PULL CABLE EXTRACTING LOCK PIN
3. ACTUATE HANDLE

TO CLOSE

1. STORE HANDLE
2. INSERT LOCK PIN
3. INSTALL COVER
4. CLOSE AND LATCH DOOR USING OUTSIDE HANDLE
5. LOCK DOOR

-834

LWR INSTR PNL., BELOW
CONTROL WHEEL SHAFT

PULL FOR ALT
STATIC SOURCE

-467

DO NOT OPEN
ABOVE 132 KIAS

BELOW PILOT'S
STORM WINDOW

COWL FLAP
CLOSED

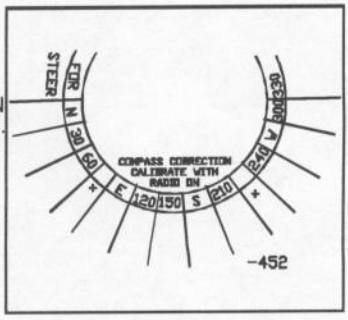
-663

COWL FLAP
OPEN

-664

ON CONSOLE
ABOVE & BELOW
COWL FLAP
SWITCH

ON
MAG.
COMPASS



-452

ABOVE EACH FUEL QTY. GAUGE
ON BEZEL (27-0258 thru 27-TBA)

44.5 GAL
USEABLE

THROTTLE
PUSH INCREASE

ABOVE
EACH

-383

CONTROL
ON LOWER

PROP
PUSH INCREASE

-385

INSTR.
PANEL

MIXTURE
PUSH RICH

-387

ABOVE ENGINE INSTRUMENT CLUSTER
on BEZEL (27-0258 thru 27-TBA)

GREEN ARC 2200 - 2575		GREEN ARC 250 - 500	GREEN ARC 1300 - 1750	GREEN ARC YELLOW ARC 55 - 95 PSI 25 - 55 PSI 95 - 115 PSI	GREEN ARC 100 - 245

DO NOT EXCEED 10 LBS (4.5 Kg) IN THIS COMPARTMENT.
WARNING: USE FOR STOWAGE OF LIGHT SOFT ARTICLES ONLY.
SEE AIR CRAFT LOAD ING SCHED ULE DATA
FOR BAGGAGE COMPARTMENT ALLOWABLE.

BAGGAGE COMPARTMENT
ON HAT RACK SHELF

-220

AROUND EACH
OXYGEN OUTLET
ON OVERHEAD
PANEL

OXY-O/H

ADJACENT TO AUX. PWR.
SUPPLY PLUG (OPTIONAL)

14 VOLTS
3 AMPS MAX.
5 A INTERMITTENT

CONSOLE
ON CONTROL
KKNOB

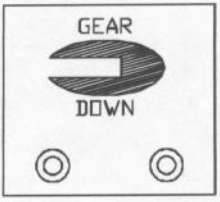
ALT AIR
PULL ON

-899

TOP OF BAGGAGE
DOOR JAMB

DO NOT EXCEED 120 LBS
WARNING: (54.4 Kg) IN THIS COMPARTMENT
SEE AIRCRAFT LOADING SCHEDULE DATA
FOR BAGGAGE COMPARTMENT ALLOWABLE

FLOORBOARD
BETWEEN
SEATS



-369

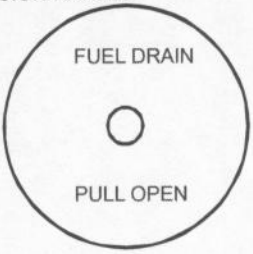
ON UPPER FLIGHT PANEL

NXXXXX

PUSH TO RELEASE

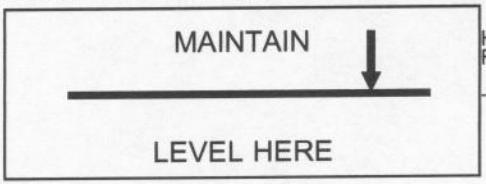
BETWEEN SEATS - ON
EMERGENCY GEAR RELEASE
EXTENSION HANDLE

FLOORBOARD
FWD OF CO-PILOT
SEAT



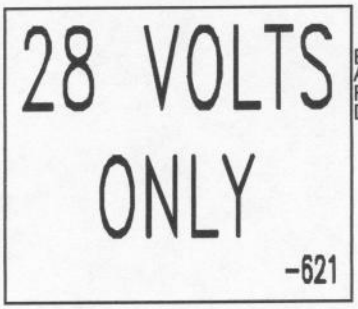
FUSELAGE INTERIOR

The following placards must be installed inside the fuselage at the locations specified.

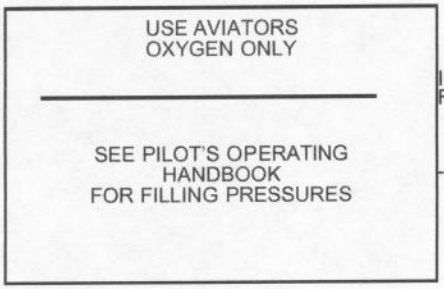


HYDRAULIC OIL RESERVOIR

-071

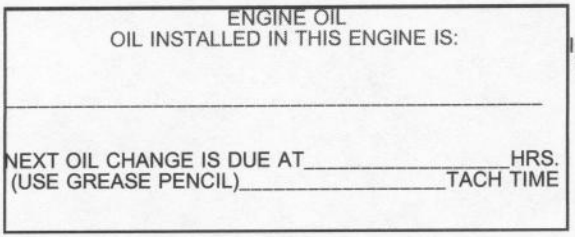


BACKSIDE OF AUX. PWR. RECEPTACLE DOOR



INSIDE OXYGEN FILLER DOOR

-945



INSIDE ENGINE OIL FILLER DOOR

-750

EXTERIOR

The following placards must be installed on the exterior of the aircraft at the locations specified.

ON INBOARD END OF FLAP, WING LEADING EDGES AND WING AHEAD OF FLAPS

NO STEP -007

UNDERSIDE OF WING (2 PLCS) & AFT OF L/H COWL FLAP (1PLC)

HOIST POINT

-011

HORIZ. STAB. L/E
RUDDER T/E (BOTH SIDES)

DO NOT PUSH

-067

UNDER TAILCONE AFT OF WING T/E

STATIC DRAIN

TIRE PRESSURE 49 PSI (3.44 Kg/cm²)

-759

PITOT DRAIN

UNDER LEFT WING L/E NEAR FUSELAGE

-179

UNDER WING, NEAR SUMP DRAINS

FUEL DRAIN

-183

GASCOLATOR DRAIN

UNDER FUSELAGE RT. SIDE AFT OF NOSE WHEEL WELL

-187

ON MAIN LDG GEAR DOOR

TIRE PRESSURE 42 PSI (2.95 Kg/cm²)

-757

TIRE PRESSURE 49 PSI (3.44 Kg/cm²)

-759

ON NOSE LANDING GEAR DOOR

TOWING LIMITS

ON NOSE LANDING GEAR LEG ASSY

-700

ON NOSE LANDING GEAR SPINDLE ASSY.

WARNING
DO NOT EXCEED TOWING LIMITS

-701

LWR L/H WING PANEL OUT/BD OF HOIST PT.

MAGNETIC AZIMUTH TRANSMITTER
LOCATED INSIDE THIS INSPECTION COVER. USE ONLY NON-MAGNETIC SCREWS FOR COVER INSTALLATION.
-884

OR 150080-6053
[USED WHEN KING KFC SYSTEMS ARE INSTALLED ONLY.]

ON BOTH FUEL FILLER CAPS

FUEL-100(GREEN) OR
100LL(BLUE) MIN OCT
44.5 U.S. GAL USABLE
168.5 LITERS USABLE

-917